Plea Bargaining: A Comparative Legal and Economic Analysis

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Abstract

Why is plea bargaining commonly employed in some countries, while its use is heavily restricted in others? I develop a formal model in which countries, which minimize the social harms from punishing the innocent and not punishing the guilty, consider the effect of different plea bargaining regimes on law enforcement agencies and individuals, and decide on the scope of plea bargaining. The model shows that higher levels of crime and a greater social emphasis on ensuring that guilty individuals are punished lead to a greater use of plea bargaining, while lower levels of crime and a greater social emphasis on ensuring that innocent individuals are not punished leads to less use of plea bargaining. Using cross-country data on victimization by common crimes and social preferences for punishing the innocent versus not punishing the guilty, and a new coding of the use of plea bargaining, I obtain results that are consistent with the model's predictions.

1 Introduction

A plea bargain is an agreement between the prosecution and the defense whereby the defendant pleads guilty in exchange for a more lenient sentence, and a full trial is avoided. Although plea bargaining is commonly employed

in some countries, its use is heavily restricted in others. What explains this national divergence with regard to plea bargaining?

To illustrate the different policies with regard to plea bargaining, while the United States does not restrict the use of plea bargaining, France, until recently, has not permitted defendants to plead guilty to indictments (Kritzer 2002, p. 383). In a reform from March 9, 2004 France introduced a version of guilty pleas and bargaining, but this new procedure is limited only to crimes punishable with no more than five years in prison, and allows the prosecutor to propose a sentence not exceeding one year in prison (Bradley 2007, p. 227). Reflecting the different restrictions on the use of plea bargaining, in 2005 only 4% of French decisions by correctional courts were made using the new guilty plea procedure (French Ministry of Justice 2006). In contrast, in the same year in the United States 86% of all criminal cases were closed as a result of a guilty plea (Federal Justice Statistics Resource Center).

The legal literature on plea bargaining has been dominated by the debate over the desirability of plea bargaining, with some scholars fiercely opposing the use of plea bargaining (Alschuler 1983, Langbein 1978, Schulhofer 1992) and others defending it (Church 1979, Easterbrook 1983 and Scott and Stuntz 1992). Although it is widely acknowledged that different countries adopt varying plea bargaining policies, each side of the debate assumes that there is only one correct policy, and does not probe the underlying reasons behind this national divergence. The economics literature on plea bargaining, which originated with Landes (1971) and Grossman and Katz (1983), takes the existence of plea bargaining as a given, and focuses on analyzing its effect or discussing certain adjustments that could improve it (Baker and Mezzetti 2001, Bar-Gill and Gazal-Ayal 2006, Bar-Gill and Ben-Shahar 2009, Miceli 1996, Mongraina and Roberts 2009, Reinganum 1988, Reinganum 2000). The national divergence with regard to plea bargaining is not considered.[1] In this paper I argue that the varying plea bargaining policies across countries can be explained by exploring the underlying preferences and circumstances of different countries. That legal institutions are determined endogenously is in the spirit of Aghion, Alesina and Trebbi (2004).

The division has traditionally been viewed by legal scholars along common law/ civil law lines; common law countries employ plea bargaining, while

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[1]One exception is Adelstein and Miceli (2001), which discusses this comparative issue from a theoretical perspective. However, its prediction regarding the effect of relative social preferences for punishing the innocent and not punishing the guilty on the use of plea bargaining stands in contrast to the this paper's prediction.

civil law countries do not. Merryman (1985, p. 130-131) explains the legal doctrines that restrict the use of plea bargaining in certain countries:

> Civil lawyers criticize the common American practice of plea bargaining. . . Their law and their prosecutorial traditions both sharply limit prosecutorial discretion. . . Most significant of all is the different effect of the guilty plea, which is an essential component of the plea bargaining system. With us, the defendant who pleads guilty forgoes a trial. In the civil law world a trial cannot be averted by a guilty plea. The accused's confession can be admitted as evidence, but the trial must go on. The court determines guilt, it is said, not the defendant or the prosecutor.

To explain the different policies with regard to plea bargaining section 2 presents a simple model. In the model a law enforcement agency detects a group of individuals as violators of the law. However, the agency may be mistaken, and for every individual there is a certain probability that he did not, in fact, violate the law. If the individuals is brought before the court there is a certain probability that the court would not find the truth (that is, the court may find an innocent individuals guilty or a guilty individual innocent).

In the model society cares about two types of social harm: The social harm from punishing an innocent individual, and the social harm from not punishing a guilty individual. Two additional assumptions in the model are that individuals vary in their degree of risk aversion, and that the law enforcement agency has limited resources.

To explain the basic intuition of the model let us ignore the social harm from mistakes the court makes when cases are brought before it. This harm complicates the analysis, and is fully considered in the formal model. If plea bargaining is permitted the agency offers a plea bargain to all individuals who it detected as violators of the law. Many guilty individuals take the offer, since they know there is only a small probability the court will find them innocent, and a plea bargain allows them to receive a more lenient sentence. A few innocent individuals who are sufficiently risk averse also take the offer, because of the risk of being convicted erroneously by the court. Therefore when plea bargaining is used some innocent individuals are punished.

If plea bargaining is prohibited then the law enforcement agency has to take part in a full trial in order for a sanction to be imposed. However,

because the agency has limited resources it will not be able to bring to court all the individuals it detected as violators of the law. Therefore, some guilty individuals will not be brought to court. Thus, when plea bargaining is prohibited some guilty individuals are not punished.

Section 2 shows that a greater social emphasis on ensuring that innocent individuals are not punished leads to less use of plea bargaining. Intuitively, if the social harm from punishing the innocent increases relative to the social harm from not punishing the guilty, then the fact that some innocent individuals choose to take the plea bargain when plea bargaining is permitted is socially more costly, while the fact that some guilty individuals are not brought to court when plea bargaining is prohibited is socially less costly. Therefore, such a change leads to less use of plea bargaining.

Section 2 also shows that an increase in the level of crime leads to a greater use of plea bargaining. Intuitively, with more criminals more guilty individuals will be left out of court when plea bargaining is prohibited. Therefore prohibiting plea bargaining becomes socially more costly, which means that such a change leads to a greater use of plea bargaining.

To see whether the model's predictions are supported by the data I use three different sets of data, described in detail in section 3. To look at the degree to which countries put an emphasis on ensuring that innocent individuals are not punished I used data from the 1996 and 2006 surveys of the International Social Survey Program (ISSP) on the role of government, where the following question was asked: All systems of justice make mistakes, but which do you think is worse? Convict an innocent person / Let a guilty person go free. To measure the overall level of crime in different countries I used standardized comparative data on one-year prevalence rate of victimization by common property and contact crimes from the International Crime Victims Survey (ICVS), which includes five survey sweeps between 1989 and 2005. To measure the scope of plea bargaining in different countries I coded the legal situation with respect to plea bargaining in different countries and years that correspond to the ISSP and the ICVS data.

As noted, the United States has no restriction on the use of plea bargaining, while France's new plea bargaining procedure is quite restricted. What explains this difference? Table 1 shows the data for France and the United States for the years 2004-2006.

Consistent with the model's prediction, 82.6% of the French population think that punishing an innocent individual is the worse type of judicial mistake while only 70.6% of the population in the United States share a

Table 1: Data for the U.S. and France, 2004-2006

	France	U.S.
Crime Prevalence	9.0	14.8
Punish Innocent Worse	82.6	70.6

similar view. This means that in France there is a greater social emphasis on ensuring that innocent individuals are not punished. Furthermore, consistent with the model's prediction, the level of crime in France is 60% of the level of crime in the United States.

Section 4 presents the empirical evidence in a systematic way. First without relying on my coding of the legal situation with regard to plea bargaining, I show that in common law countries there is a lower concern for punishing the innocent and higher prevalence of crime. This finding is consistent with the model, since, as noted, common law countries traditionally had plea bargaining, while civil law countries did not. Then, using my coding of the legal situation with regard to plea bargaining, I show that lower levels of concern about punishing the innocent and higher levels of crime are associated with greater use of plea bargaining.

Section 5 addresses the possibility of reverse causality, and section 6 makes some concluding remarks, noting the implications of the paper for future analysis of other legal institutions.

2   The Model

2.1   Set Up

Consider a model with a law enforcement agency, a court and measure N of individuals that the agency detected as violators of the law. For every individual there is a probability $\alpha \in [0,1]$ that the agency made a mistake, and the individual did not, in fact, violate the law. The individual knows whether he violated the law.

If an innocent individual is brought before the court then with probability $\beta_1 \in (0,1)$ the court will make a mistake and find the individual guilty. If a guilty individuals is brought before then with probability $\beta_2 \in (0,1)$ the court will make a mistake and find the individual innocent. Think of β_1 and β_2 as being relatively small, and specifically assume that $\beta_1, \beta_2 < \frac{1}{2}$.

The sanction for the violation of the law is s. The individual's disutility from a sanctions s is captured by the following constant relative risk aversion (CRRA) function:

$$u(s, \theta) = -\frac{s^{1+\theta}}{1+\theta} \tag{1}$$

where $\theta \in (-1, \infty)$, the coefficient of relative risk aversion, is assumed to be distributed in the population based on a distribution function $F(\cdot)$. The higher θ the more risk averse the individual is. Specifically, for $\theta < 0$ the individual is risk preferring, for $\theta = 0$ the individual is risk neutral, and for $\theta > 0$ the individual is risk averse.[2]

In a plea bargain the law enforcement agency offers the individuals a lower sanction $(1 - \gamma)s$ in return for a confession, where $\gamma \in (0, 1)$ is the discount in the sanction. If a plea bargain is reached the agency's cost is normalized to zero, while if a case is brought before the court for a trial the agency bears the cost of litigation. The agency has limited resources and therefore the maximum number of full trials it can take part in is a measure $n < N$.

The the law enforcement agency maximize the expected number of convictions weighted by the size of the sanction, which is the conventional assumption in the law and economics literature (see, e.g., Landes 1971 and Bar-Gill and Ben-Shahar 2009).

Define two types of social harms: h_1 – the social harm from punishing an individual who did not violate the law (type 1 error, false positive); and h_2 – the social harm from not punishing an individual who did violate the law (type 2 error, false negative). For later use let us define the social harms ratio as $\frac{h_1}{h_2}$.

It is worth noting that the law and economics literature has traditionally focused on deterrence, and in that context, as emphasized in Png (1986), one can show that both types of error reduce deterrence (Kaplow and Shavell 2002, p. 1753). The two types of error are treated differently here since this paper does no focus on deterrence but rather on enforcement, and as section 3 shows we have a direct measure of the social preferences for the two error types that can be used.

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[2] On individuals' possible attitudes toward a risk of a sanction see Polinsky and Shavell (1999).

2.2 Analysis

Consider two policies: allowing plea bargaining or prohibiting it. Let us proceed by backward induction to analyze the consequences of each policy.

2.2.1 Individuals

If plea bargaining is permitted and the agency offers a plea bargain to all individuals it detected as violators of the law, innocent individuals will accept the offer only if their utility from the plea bargain is higher than their expected utility from going to court. That is only if:

$$u((1-\gamma)s, \theta) \geq \beta_1 u(s, \theta) + (1-\beta_1)u(0, \theta) \tag{2}$$

where the left hand side of expression 2 is the individual's utility from the plea bargain with a sanction $(1-\gamma)s$, and the right hand side of expression 2 is the individual's expected utility from going to court, given a probability β_1 of the court making an error and finding him guilty. Using the utility function from expression 1 we can define θ_1, the coefficient of relative risk aversion for which expression 2 holds with equality, as:

$$\theta_1 = \frac{\ln \beta_1}{\ln(1-\gamma)} - 1 \tag{3}$$

Innocent individuals with $\theta \geq \theta_1$ will choose to settle, while innocent individuals with $\theta < \theta_1$ will not settle but will go to court. In other words, innocent individuals who are relatively risk averse will accept the plea bargain, while innocent individuals who are relatively risk preferring will not. Note that $\frac{\partial \theta_1}{\partial \beta_1} < 0$ and $\frac{\partial \theta_1}{\partial \gamma} < 0$.[3] Intuitively, the higher the probability of the court making a mistake and finding an innocent individual guilty, or the higher the discount in the sanction for pleading guilty, the more the innocent individuals are willing to accept the plea bargain. Note also that θ_1 does not depend on the size of the sanction s.

Similarly, for guilty individuals we can define:

$$\theta_2 = \frac{\ln(1-\beta_2)}{\ln(1-\gamma)} - 1 \tag{4}$$

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[3] $\frac{\partial \theta_1}{\partial \beta_1} = \frac{1}{\beta_1 \ln(1-\gamma)} < 0$ and $\frac{\partial \theta_1}{\partial \gamma} = \frac{\ln \beta_1}{(1-\gamma)[\ln(1-\gamma)]^2} < 0$ (recall that $\beta_1, \gamma \in (0,1)$).

Guilty individuals with $\theta \geq \theta_2$ will choose to settle, while innocent individuals with $\theta < \theta_2$ will not settle but will go to court. Note now that $\frac{\partial \theta_2}{\partial \beta_2} > 0$ and $\frac{\partial \theta_2}{\partial \gamma} < 0$.[4] Intuitively, the higher the probability of the court making a mistake and finding the guilty individual innocent the less the guilty individuals are willing to accept the plea bargain, while the higher the discount in the sanction for pleading guilty the more the guilty individuals are willing to accept the plea bargain. Note also that since we assumed $\beta_1, \beta_2 < \frac{1}{2}$ we get $\theta_1 > \theta_2$, which means that innocent individuals have to be more risk averse than guilty individuals to take the plea bargain. As before, θ_2 does not depend on the size of the sanction s.

To summarize, If plea bargaining is permitted and the agency offers a plea bargain to all individuals it detected as violators of the law, of the innocent individuals a fraction $1 - F(\theta_1)$ will take the offer and fraction $F(\theta_1)$ will go to court. Of the guilty individuals a fraction $1 - F(\theta_2)$ will take the offer and fraction $F(\theta_2)$ will go to court. Since $\theta_1 > \theta_2$, $F(\theta_1) \geq F(\theta_2)$, which means that a greater fraction of innocent individuals than guilty individuals rejects the plea bargain and goes to court.

2.2.2 Law Enforcement Agencies

Recall that the law enforcement agency maximize the expected number of convictions weighted by the size of the sanction. Therefore, if plea bargaining is permitted, and assuming that the agency's resource constraint is not binding, the agency's expected utility is:

$$
\begin{aligned}
U \;=\; & \alpha[(1 - F(\theta_1))(1 - \gamma) + F(\theta_1)\beta_1]s + \\
& (1 - \alpha)[(1 - F(\theta_2))(1 - \gamma) + F(\theta_1)(1 - \beta_2)]s
\end{aligned} \tag{5}
$$

The first term in expression 5 is the share of individuals who are innocent (α), who either choose to accept the plea bargain and not go to trial $(1 - F(\theta_1))$ and thus receive the discounted sentence $(1 - \gamma)$, or go to trial but are found guilty by the court $(F(\theta_1)\beta_1)$, multiplied by size of the sanction sanction (s). The second term in expression 5 is the share of individuals who are guilty $(1 - \alpha)$, who either choose to accept the plea bargain and not go to trial $(1 - F(\theta_2))$ and thus receive the discounted sentence $(1 - \gamma)$, or go to trial

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[4] $\frac{\partial \theta_2}{\partial \beta_2} = \frac{-1}{(1 - \beta_2)\ln(1 - \gamma)} > 0$ and $\frac{\partial \theta_1}{\partial \gamma} = \frac{\ln(1 - \beta_2)}{(1 - \gamma)[\ln(1 - \gamma)]^2} < 0$ (recall that $\beta_2, \gamma \in (0, 1)$).

but are found guilty by the court ($F(\theta_2)(1 - \beta_2)$), multiplied by size of the sanction sanction (s).

How does the law enforcement agency choose γ, the discount in the sentence for pleading guilty? Since the agency maximizes the expected number of convictions weighted by the size of the sanction, when choosing γ the agency faces a tradeoff. Increasing γ increases the number of individuals who choose to take the plea bargain rather than go to court (since, as was shown, $\frac{\partial \theta_1}{\partial \gamma}, \frac{\partial \theta_2}{\partial \gamma} < 0$), but reduces the sanction that they receive. The formal derivation of this optimization is the following first order condition:[5]

$$
\begin{aligned}
-\bar{\alpha} f(\theta_1) \tfrac{\partial \theta_1}{\partial \gamma}[(1 - \gamma) - \beta_1] - (1 - \bar{\alpha}) f(\theta_2) \tfrac{\partial \theta_2}{\partial \gamma}[(1 - \gamma) - (1 - \beta_1)] = \\
\bar{\alpha}(1 - F(\theta_1)) + (1 - \bar{\alpha})(1 - F(\theta_1))
\end{aligned}
\tag{6}
$$

The top line in expression 6 is the benefit from slightly increasing γ. Increasing γ means that more innocent individuals will chose to plea guilty ($-\bar{\alpha} f(\theta_1) \frac{\partial \theta_1}{\partial \gamma}$) and the benefit to the agency is the difference between their sentence when pleasing guilty ($1 - \gamma$) and their expected sentence when take to court (β_1) . Similarly, Increasing γ means that more guilty individuals will chose to plea guilty ($-(1 - \bar{\alpha}) f(\theta_2) \frac{\partial \theta_2}{\partial \gamma}$) and the benefit to the agency is the difference between their sentence when pleasing guilty ($1 - \gamma$) and their expected sentence when take to court ($1 - \beta_1$). The bottom line in expression 6 is the cost from slightly increasing γ. Increasing γ means that individuals who pleaded guilty before the increase in γ (whether innocent, $\bar{\alpha}(1 - F(\theta_1))$, or guilty $(1 - \bar{\alpha})(1 - F(\theta_1))$) will receive a lower sentence.

2.2.3   Social Planner

What are the social costs of allowing or prohibiting plea bargaining? Let us use as a benchmark the case where, out of the population of individuals who were detected as violators of the law, only the guilty individuals are punished. The social cost of allowing or prohibiting plea bargaining can be then analyzed in comparison to this first best benchmark case. The focus here is on the social harm from the two types of mistakes – punishing the innocent and not punishing the guilty.

When plea bargaining is permitted the agency offers a plea bargain to all individuals it detected as violators of the law. Individuals who are sufficiently

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[5]I assume the second order condition holds.

risk averse will take the offer. Specifically, a fraction $1 - F(\theta_1)$ of the innocent individuals and a fraction $1 - F(\theta_2)$ of the guilty individuals will take the offer. Therefore, the social cost of permitting plea bargaining is:

$$H_{PB} = \alpha[1 - F(\theta_1) + F(\theta_1)\beta_1]h_1 + (1 - \alpha)F(\theta_2)\beta_2 h_2 \qquad (7)$$

The first term in expression 7 is the share of individuals who are innocent (α), who either choose to accept the plea bargain and not go to trial ($1 - F(\theta_1)$) or go to trial but are found guilty by the court ($F(\theta_1)\beta_1$), multiplied by the social harm from punishing the innocent (h_1). The second term in expression 7 is the share of individuals who are guilty ($1 - \alpha$), who choose to go to trial and are found innocent by the court ($F(\theta_2)\beta_2$), multiplied by the social harm from not punishing the guilty (h_2).[6]

When plea bargaining is prohibited the agency knows that in order to impose a sanction it has to go to trial. As noted, the agency will bring a lawsuit only in a fraction $\frac{n}{N}$ of the cases. Thus, the social cost of prohibiting plea bargaining is:

$$H_{NPB} = \alpha\frac{n}{N}\beta_1 h_1 + (1 - \alpha)[1 - \frac{n}{N} + \frac{n}{N}\beta_2]h_2 \qquad (8)$$

The first term in expression 8 is the share of individuals who are innocent (α), who the agency sues ($\frac{n}{N}$), but are found guilty by the court (β_1), multiplied by the social harm from punishing the innocent (h_1). The second term in expression 8 is the share of individual who are guilty ($1 - \alpha$), who are either not sued ($1 - \frac{n}{N}$) or are sued but are found innocent by the court ($\frac{n}{N}\beta_2$), multiplied by the social harm from not punishing the guilty (h_2).

Note that $H_{NPB} > H_{PB}$ when $\alpha = 0$,[7] and that $H_{PB} > H_{NPB}$ when $\alpha = 1$.[8] Since both H_{PB} and H_{NPB} are monotonic in α ($\frac{\partial H_{PB}}{\partial \alpha}$ and $\frac{\partial H_{NPB}}{\partial \alpha}$ do not depend on α), the probability of a mistake by the agency, we can define α^*, the unique α for which $H_{PB} = H_{NPB}$:

$$\alpha^* = \frac{[1 - \frac{n}{N}(1 - \beta_2) - F(\theta_2)\beta_2]h_2}{[1 - \frac{n}{N}(1 - \beta_2) - F(\theta_2)\beta_2]h_2 + [1 - F(\theta_1)(1 - \beta_1) - \frac{n}{N}\beta_1]h_1} \qquad (9)$$

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[6] I am assuming here that the number of trials, $\alpha F(\theta_1) + (1-\alpha)F(\theta_2)$, is relatively small, so the agency's resource constraint is not binding. As will be seen later, in equilibrium the relevant condition is that $\frac{n}{N} \geq \alpha^* F(\theta_1) + (1 - \alpha^*)F(\theta_2)$, since $\alpha^* F(\theta_1) + (1 - \alpha^*)F(\theta_2)$ is the maximum number of cases that are not settled when plea bargaining is used.

[7] Since $1 - \frac{n}{N} > \beta_2[F(\theta_2) - \frac{n}{N}]$.

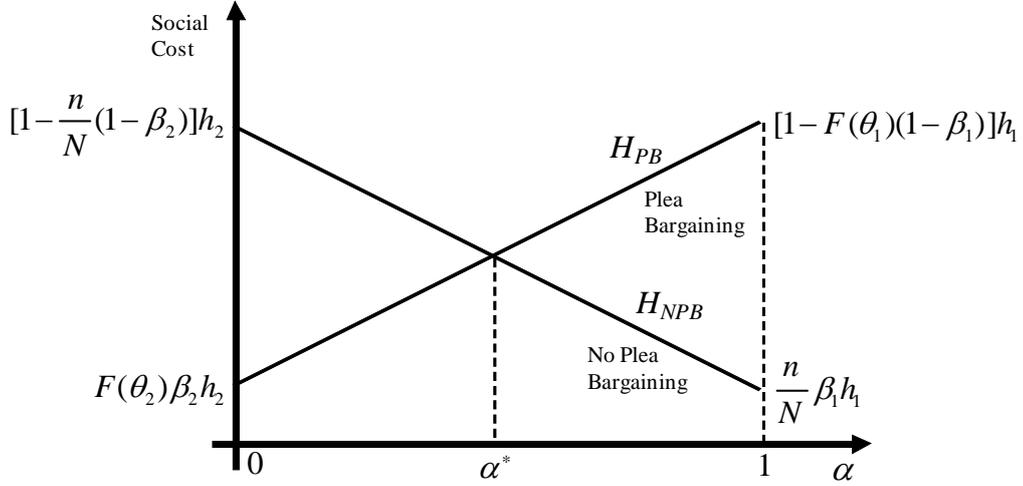[8] Since $1 - F(\theta_1) > \beta_1[\frac{n}{N} - F(\theta_1)]$.

Figure 1: The Social Cost of Permitting and Prohibiting Plea Bargaining

The term α^* is the probability of mistake by the agency for which the social cost of allowing plea bargaining is equal to the social cost of prohibiting plea bargaining. To illustrate, when $h_1 = 0$, that is when there is no social harm from punishing the innocent, we get $\alpha^* = 1$, which means that plea bargaining will always be used. When $h_2 = 0$, that is when there is no social harm from not punishing the guilty, we get $\alpha^* = 0$, which means that plea bargaining will never be used. Figure 1 depicts H_{PB}, H_{NPB} and α^*.

Proposition 1 *The optimal policy regarding plea bargaining is determined by comparing the social costs of allowing and prohibiting plea bargaining. If $\alpha < \alpha^*$, that is if the probability of the agency making a mistake in detecting violators of the law is relatively low, plea bargaining should be permitted. If $\alpha > \alpha^*$, that is if the probability of the agency making a mistake in detecting violators of the law is relatively high, plea bargaining should be prohibited.*

Proposition 1 can be understood intuitively. When plea bargaining is permitted some innocent individual will choose to accept the plea bargain, because of their risk aversion. When plea bargaining is prohibited some guilty individuals will not be punished, since the agency will no sue all the individuals it detected as violators of the law because of its limited resources.

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When the probability of the agency making a mistake in detecting violators of the law is relatively low only few innocent individuals will be punished if plea bargaining is permitted, since most of the individuals who will choose to settle will be guilty, but many guilty individuals will not be punished if plea bargaining is prohibited, since most of the individuals who the agency will not sue in court will be guilty. Therefore in such a case it is optimal to allow plea bargaining. By contrast, when the probability of the agency making a mistake in detecting violators of the law is relatively high many innocent individuals will be punished if plea bargaining is permitted, since most of the individuals who will choose to settle will actually be innocent, but only few guilty individuals will not be punished if plea bargaining is prohibited, since most of the individuals who the agency will not sue will be innocent. Therefore in such a case it is optimal to prohibit plea bargaining.

2.3   Comparative Statics

How do changes in the parameters of the model affect the decision whether to allow plea bargaining? We can address this question by analyzing the change in α^*, the threshold probability of a mistake by the agency under which allowing plea bargaining is optimal and over which prohibiting plea bargaining is optimal, as a result of a change in a parameter. If α^* decreases as result of a change in a parameter, it means that plea bargaining will be prohibited in more cases. If α^* increases as result of a change in a parameter, it means that plea bargaining will be permitted in more cases.

2.3.1   Change in the Social Harms Ratio

Recall that the social harms ratio is $\frac{h_1}{h_2}$, reflecting the relative social harms from punishing innocent individuals (h_1) and not punishing guilty individuals (h_2). An increase in the social harms ratio reflects a greater social emphasis on ensuring that innocent individuals are not punished, while a decrease in the social harms ratio reflects a greater social emphasis on ensuring that guilty individuals are punished.

How does a change in the social harms ratio affect the decision whether to allow plea bargaining? We can write α^* from expression 9 as:

$$\alpha^* = \frac{1}{1 + \frac{1 - F(\theta_1)(1-\beta_1) - \frac{n}{N}\beta_1}{1 - \frac{n}{N}(1-\beta_2) - F(\theta_2)\beta_2} \frac{h_1}{h_2}} \tag{10}$$

Since the term multiplying $\frac{h_1}{h_2}$ in expression 10 is positive,[9] it is straightforward to show using expression 10 that $\frac{\partial \alpha^*}{\partial h_1/h_2} < 0$. This results is summarized in the following proposition.

Proposition 2 *A greater social emphasis on ensuring that innocent individuals are not punished, which is reflected in a higher social harms ratio, leads to a smaller α^* and therefore less use of plea bargaining. A greater social emphasis on ensuring that guilty individuals are punished, which is reflected in a lower social harms ratio, leads to a larger α^* and therefore a greater use of plea bargaining.*

2.3.2 Increase in Crime

How does an increase in crime affect the decision whether to allow plea bargains? An increase is crime is reflected in the model by an increase in N, the measure of individuals that the agency detected as violators of the law. One can show using expression 10 that, for β_2 sufficiently small, $\frac{\partial \alpha^*}{\partial N} > 0$.[10] We therefore get the following proposition:

Proposition 3 *An increase in crime leads to a greater use of plea bargaining.*

Proposition 3 can be understood intuitively. When plea bargaining is prohibited and there is an increase in crime then the agency is able to sue a smaller fraction of the individuals it detected as violators of the law, since its resource constraint is binding. Therefore, when plea bargaining is prohibited more guilty individuals will go unpunished. This makes prohibiting plea bargaining relatively less appealing, and therefore there will be a greater use of plea bargaining.

3 Data

I use three different sets of data in my analysis. To look at the degree to which countries put an emphasis on ensuring that innocent individuals are

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[9]Note that in the term $\frac{1-F(\theta_1)(1-\beta_1)-\frac{n}{N}\beta_1}{1-\frac{n}{N}(1-\beta_2)-F(\theta_2)\beta_2}$ the numerator and the denominator are positive both for $\frac{n}{N} = 0$ and $\frac{n}{N} = 1$, and their derivative with respect to $\frac{n}{N}$ is monotonic in $\frac{n}{N}$ (does not depends on $\frac{n}{N}$).

[10]Formally, sign$\{\frac{\partial \alpha^*}{\partial N}\}$ =sign$\{(1 - \beta_1 - \beta_2)(1 - F(\theta_1)) - \beta_1\beta_2(F(\theta_1) - F(\theta_2))\}$. For β_2 sufficiently small this term is positive.

not punished or that guilty individuals are punished I use data from the 1996 and 2006 surveys of the International Social Survey Program (ISSP) on the role of government. In particular, I look at the answers to the following question: All systems of justice make mistakes, but which do you think is worse? Convict an innocent person / Let a guilty person go free. For every country I use the percentage of people who thought that convicting an innocent person is worse than letting a guilty person go free. I have the data for 23 countries in 1996, and 34 countries in 2006.[11]

To measure the overall level of crime in different countries in different times I use data from the International Crime Victims Survey (ICVS). Five survey sweeps between 1989 and 2005 have standardized comparative data on ten common property and contact crimes (van Dijk, van Kesteren, and Smit 2007; Alvazzi del Frate 1998; Hatalak, Alvazzi del Frate and Zvekic 1998). I used the one-year prevalence rate of victimization by any of five common crimes (burglary, attempted burglary, personal theft, robbery and assault), that is the probability of being the victim of any of these five crimes at least once in the year before the survey.[12] I have data for 12 countries in 1989, 11 countries in 1992, 31 countries in 1996, 15 countries in 2000, and 27 countries in 2004-2005.

To measure the scope of plea bargaining in different countries I created a plea bargaining index by coding the legal situation with respect to plea bargaining in different countries. Several sources were relied upon: The World Factbook of Criminal Justice Systems (Bureau of Justice Statistics 1993, 2002), Euro Justice (European Commision 2004) for European Union members and Bradley (2007). Where I couldn't find the legal situation in these sources I used other country specific sources detailed in the data appendix. Countries that do not have plea bargaining (or a similar procedure) or that have plea bargaining that is restricted to minor crimes where a prison sentence may not be imposed, were coded with 1. Countries that use plea

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[11] The 2006 Slovakia data was not integrated into the 2006 ISSP survey, since the survey has been fielded in Slovakia only in october 2008. I obtained the data directly from the ISSP Slovakian representative.

[12] I did not include in my measure the following crimes: theft of a car, theft from a car, car vandalism, theft of a bicycle, theft of a motorcycle and sexual offense. These crimes are harder to compare across countries, since what constitutes a sexual offense can vary among countries, and crimes that are related to certain means of transport could reflect the prevelance of that means of transport (for example, in the Netherlands bicycle theft is relatively common, and in certain developing countries with otherwise high crime prevelance car theft is relatively uncommon).

Table 2: Descriptive Statistics

	Obs.	Mean	St. Dev.	Min	Max
Crime Prevalence	96	16.26	9.94	2.7 (JAP)	51.8 (ZWE)
Punish Innocent Worse	57	73.27	9.45	44.3 (TWN)	92.0 (NOR)
Plea Bargaining Level	72	1.84	0.833	1	3

bargaining or a similar procedure but do not allow its use for severe crimes with a prison sentence over a certain length were coded with 2. Countries that place no restrictions on the use of plea bargaining (except perhaps for death penalty) were coded with 3. The data appendix details the plea bargaining coding for different countries.

The coding of the legal systems of different countries as civil law or common law were taken from the data that was used for La Porta, Lopez-de-Silanes, and Shleifer (2008).

Table 2 shows summary statistics of the variables.

4 Evidence

4.1 Correlations with Common Law

As a first pass at the data I look at the correlation between common law countries, crime prevalence and the percentage of the population that thinks that punishing the innocent is a worse type of judicial mistake. As noted, traditionally common law countries had plea bargaining while civil law countries did not. Therefore, if the model is correct one would expect to see that common law countries have lower percentage of the population that says that punishing the innocent is a worse type of judicial mistake and a higher crime prevalence.

First, let us focus on the 2005-2006 data in the OECD countries. Figure 2 shows the ISSP data for OECD countries in 2006, that is the percentage of people in every country who thought that convicting an innocent person (rather than letting a guilty person go free) is the worse type of judicial mistake. The legal system of every country, whether civil law or common law, is also indicated in the figure. One can see that common law countries are concentrated at right side of the figure, with a relatively low level of concern for punishing the innocent.
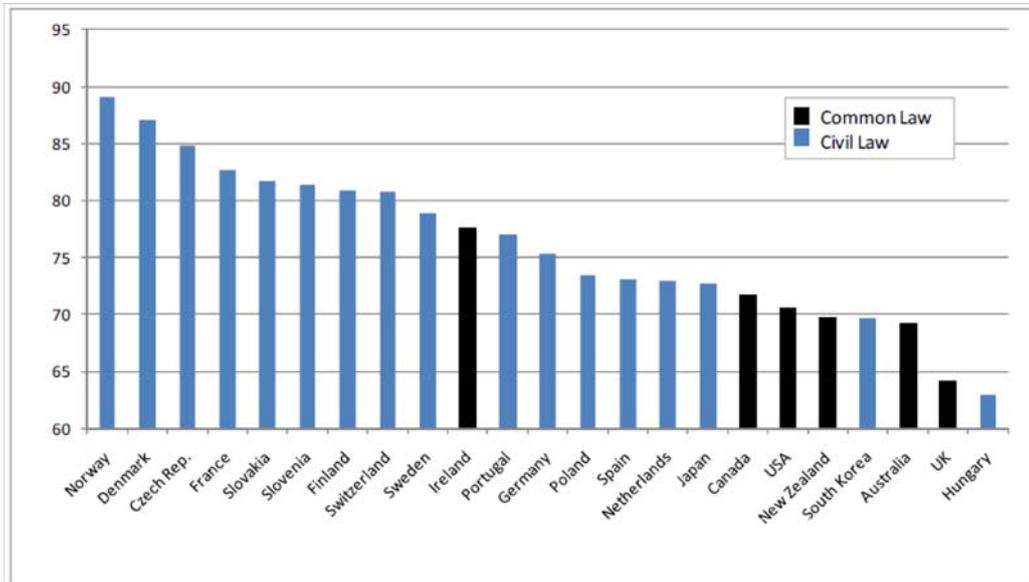
15

Figure 2: Percentage of people who think that convicting an innocent person is the worse type of judicial mistake, OECD Countries, 2006

Figure 3 shows the ICVS data for OECD countries in 2005, that is the level of crime in every country. Again, the legal system of every country is indicated. One can see that common law countries are concentrated at left side of the figure, with relatively high levels of crime.

Figures 2 and 3 present suggestive evidence that in common law countries there is a lower concern for punishing the innocent and a higher prevalence of crime. These findings seem consistent with the predictions of the model, since, as noted, common law countries traditionally had plea bargaining, while civil law countries did not.

Now, let us turn to the complete data. Table 3 shows the correlation between the legal system and the percentage of the population that says that punishing the innocent is a worse type of judicial mistake. In specification (1) the dependent variable is the percentage of the population that says that punishing the innocent is a worse type of judicial mistake, while the independent variable is a dummy for countries with a common law legal system. Specification (2) adds year fixed effects. One can see that common law countries have 6.48 percent less people who say that punishing the innocent is a
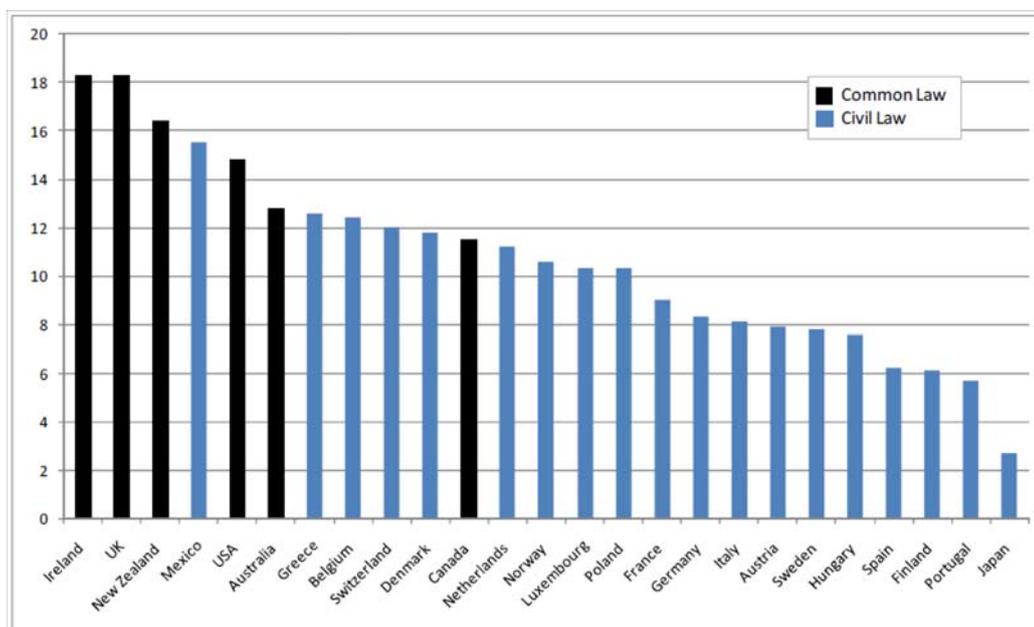
Figure 3: Crime Prevalence, OECD Countries, 2005

worse type of judicial mistake, which is two thirds of the standard deviation. There is no significant change in the coefficient when I control for year fixed effects.

Table 4 shows the correlation between the legal system and crime prevalence. In specification (1) the dependent variable is the measure of crime prevalence that was described in section 3, while the independent variable is a dummy for countries with a common law legal system. Specification (2) adds year fixed effects. Controlling for year fixed effects we see that common law countries have 6.59 points more prevalence of crime, or two thirds of the standard deviation. If we include a dummy for developing countries (that is countries from Alvazzi del Frate 1998), as in specification (3), we see that being a developing country has a major positive effect on crime prevalence. However, controlling for developing countries does not decrease the coefficient of common law by a lot, and we still find a strong correlation between common law countries and crime prevalence.

The two correlations that were shown in Tables 3 and 4 seem to be consistent with the model, and do not depend on my coding of the legal situation

Table 3: Punishing Innocent is Worse

	(1)	(2)
Common	−6.24**	−6.48**
	(2.75)	(2.74)
Year FE		✓
Observations	57	57
R^2	0.09	0.10

* $p \leq 0.1$, ** $p \leq 0.05$, *** $p \leq 0.01$

Table 4: Crime Prevalence

	(1)	(2)	(3)
Common	6.98***	6.59***	5.78***
	(2.38)	(1.99)	(1.59)
Year FE		✓	✓
Developing			14.73***
			(3.41)
Obs.	96	96	96
R^2	0.10	0.42	0.59

* $p \leq 0.1$, ** $p \leq 0.05$, *** $p \leq 0.01$

in different countries with respect to plea bargaining.

4.2 Using The Plea Bargaining Index

Recall that according to proposition 2 a lower social concern for punishing the innocent and a higher concern for not letting the guilty go free lead to a greater use of plea bargaining. According to proposition 3 higher levels of crime lead to a greater use of plea bargaining. Using the plea bargaining index in different countries one can analyze more directly whether a lower concern for punishing the innocent and a higher level of crime are associated with a greater use of plea bargaining.

In table 5 the dependent variable is the index of the use of plea bargaining that was described in section 3. Higher levels of this index mean a greater use of plea bargaining. The table present results of an OLS regression, with

Table 5: Scope of Plea Bargaining

	(1)	(2)	(3)
Punish Innocent Worse	-0.036^{***}		-0.039^{**}
	(0.009)		(0.019)
Crime Prevalence		0.076^{***}	0.076^{***}
		(0.016)	(0.022)
Obs.	56	52	36
R^2	0.16	0.24	0.350

* $p \leq 0.1$, ** $p \leq 0.05$, *** $p \leq 0.01$

robust standard errors.[13]

In specification (1) the independent variable is the percentage of the population that says that punishing the innocent is the worse type of judicial mistake. Since the coefficient is negative and significant we can say that a lower concern for punishing the innocent and higher concern for not letting the guilty go free are associated with a greater use of plea bargaining.

In specification (2) the independent variable is the measure of crime prevalence that was described in section 3. Since the coefficient is positive and significant we can say that higher levels of crime are associated with a greater use of plea bargaining.

Specification (3) includes as independent variables both the percentage of the population that says that punishing the innocent is the worse type of judicial mistake and the measure of crime prevalence. Both coefficients are significant in this specification. Using the coefficients from specification (3) and the figures from table 2, a one standard deviation increase in crime prevalence joint with a one standard deviation decrease in the percentage of the population that says that punishing the innocent is the worse type of judicial mistake is associated with an increase in the plea bargaining index of 130% of the standard deviation.

The results shown in Table 5 seem consistent with the model, that is with the predictions of propositions 2 and 3. A lower concern for punishing the innocent and a higher prevalence of crime are associated with a greater use of plea bargaining.

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[13]The results also hold with standard significance levels using an ordered logit regression.

5 Discussion

The evidence in section 4 shows that a lower concern for punishing the innocent is associated with a greater use of plea bargaining. However, one could make a reverse causation argument. That is, one could argue that it is not the preferences that determine the scope of plea bargaining in each country, but it is that scope of plea bargaining that affects citizens' preferences. If a country decides to permit the use of plea bargaining it causes the population to care less about punishing the innocent, while if a country prohibits the use of plea bargaining it causes the population to care more about punishing the innocent.

To address this concern I look at the United States General Social Survey (GSS) for 2006. The survey includes the same question that was analyzes before: All systems of justice make mistakes, but which do you think is worse? Convict an innocent person / Let a guilty person go free. The survey also asks people to name their country of family origin.

Since in the United States plea bargaining is commonly employed, if it is the plea bargaining policy that determines social preferences one would not expect to see that the preferences of people in the United States are associated with the preferences in their respective countries of family origin. For example, a person living in the United States whose family originated in France should not be more likely than others to think that punishing the innocent is the worse type of mistake, even though this view is more common in France than in other countries.

In table 6 the dependent variable is a binary variable representing the person's answer to the question on punishing the innocent versus not punishing the guilty. The variable takes the value one if the person answered that punishing the innocent is the worse type of mistakes. Table 6 presents the marginal effects of a logit regression with robust standard errors.

In specification (1) the independent variable is the percentage of the population in the person's country of origin that says that punishing the innocent is the worse type of judicial mistake, taken from the 2006 ISSP survey. For example, if a person's said that his country of family origin his France, than the value of the independent variable is the percentage of the population in France that said in 2006 that punishing the innocent is the worse type of judicial mistake. Since the coefficient is positive and significant we can say that a higher concern for punishing the innocent in one's country of family origin increases the likelihood of that person thinking that punishing the in-

Table 6: Punishing the Innocent is Worse - U.S. GSS 2006

	(1)	(2)	(3)	(4)
Punish Innocent Worse in	0.0101***	0.0095**	0.009**	0.0084**
Country of Family Origin	(0.0039)	(0.004)	(0.004)	(0.004)
Age		0.0007	0.001	0.0005
		(0.0012)	(0.0012)	(0.0012)
Female		−0.0364	−0.0345	−0.0274
		(0.0394)	(0.0392)	(0.04)
Education			0.0242***	0.024***
			(0.0077)	(0.0077)
Conservative				0.0052
				(0.0133)
Obs.	521	515	515	503

* $p \leq 0.1$, ** $p \leq 0.05$, *** $p \leq 0.01$

nocent is the worse type of judicial mistake. Specifically, an increase of 1% in the number of people in a country who think that punishing the innocent is the worse type of judicial mistake increases the likelihood of a person whose family originated from that country holding a similar position by 1%.

In specification (2) I control for age and gender. Older people seem to care more about not punishing the innocent, while women seem to care less. However, these effects are not significant.

Specification (3) adds years of education as an independent variable. More years of education are associated with more concern about punishing the innocent, and the effect is statistically significant. An increase in one years of schooling increases the probability that a person think that punishing the innocent is the worse type of judicial mistake by 2.4%. However, the effect of preferences in one's country of family of origin remains significant.

Specification (4) adds a measure of how conservative a person is.[14] Surprisingly, there is no correlation between a person's ideology and his opinion about the worse type of judicial mistake. Even when controlling for ideology the effect of preferences in one's country of family of origin remains significant.

Under all specifications Americans' preferences are correlated with the preferences in their country of family of origin. This result seems inconsistent

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[14] A 1-7 scale, where 1 is extremely conservative and 7 is extremely liberal.

with a reverse causation argument, that the plea bargaining policy affects people's preferences, since plea bargaining is widely employed in the United States. It seems to imply that there is some persistence in preferences.

6   Concluding Remarks

Why do different countries have different policies regarding plea bargaining? Using a formal model I argue that different policies reflect different social preferences for the two types of judicial mistakes: punishing the innocent and not punishing the guilty. Lower concern for punishing the innocent leads to greater use of plea bargaining. Furthermore, the model also shows that higher levels of crime lead to a greater use of plea bargaining. Using cross country data on crime prevalence and on social preferences for the different types of judicial mistakes, and a new index of the legal situation with respect to plea bargaining in different countries, I find results that are consistent with the model's prediction.

In principle the model should be more directly applicable to democracies, where voters preferences play a significant role in policy making. Indeed, almost all the countries in the ISSP data are democracies. However, one should remember that dictators' policy decisions are also influenced by social demands, even if in a less direct manner.

If indeed plea bargaining policies across countries are explained by the degree to which countries put an emphasis on ensuring that innocent individuals are not punished, then a similar analysis of other legal institutions may be in order. Like plea bargaining, many legal institutions balance competing values. Since countries may weigh values differently, one should consider how these differences filter into the design of legal institutions across countries.

A   Data Appendix

Table 7 details the plea bargaining index for different countries and years. Countries that do not have plea bargaining (or a similar procedure), or that have plea bargaining that is restricted to minor crimes where a prison sentence may not be imposed, were coded with 1. Countries that use plea bargaining but do not allow its use for severe crimes with a prison sentence over a certain length were coded with 2. Countries that place no restrictions

on the use of plea bargaining (except for death penalty in certain countries) were coded with 3.

Table 7: Plea Bargaining Level

	1995	2005		1995	2005		1995	2005
Australia	3	3	France	1	2	Philippines	3	3
Austria	1	1	Germany	2	2	Poland	1	2
Belgium	1	1	Hungary	1	2	Portugal	1	1
Bulgaria	2	2	Irealnd	3	3	Russia	1	2
Canada	3	3	Israel	3	3	Slovakia		1
Chile		2	Italy	2	2	Slovenia	1	1
Taiwan		2	Japan	1	1	S. Africa		3
Croatia		1	S. Korea		1	Spain	2	2
Cyprus	3		Latvia	2	2	Sweden	1	1
Czech Rep.	1	1	Netherlands	1	1	Switzerland	1	1
Denmark		1	Luxembourg		1	U.K.	3	3
Domin.Rep.		2	Mexico		1	U.S.A.	3	3
Finland	1	1	N. Zealand	3	3	Venezuela		3
Estonia	1	1	Norway	2	2			

The three main sources I used to code the legal situation with respect to plea bargaining in different countries were The World Factbook of Criminal Justice Systems (Bureau of Justice Statistics 1993, 2002), Euro Justice (European Commision 2004) for European Union members and Bradley (2007). Where I could not find the legal situation in these sources I used other country specific sources including the legal codes of the countries. For the Philippines I used Bautista (2003, pp. 88-91) for Taiwan Lo (2006, pp. 233-234), for South Africa Skeen (2004, pp. 524-525), and for Switzerland Trechse and Killias (2004, pp. 276-277, 283). For Bulgaria, Croatia, the Dominican Republic and Chile I consulted their criminal procedure code. For South Korea I consulted a South Korean Judge. I also relied on Bárd (2007, pp. 230-232) for Hungary, Dean (2002, p. 37) for Japan, and Kyprianou (2009, p. 170) for Cyprus.

References

Adelstein, Richard and Thomas J. Miceli. 2001. Toward a Comparative Economics of Plea Bargaining. *European Journal of Law and Economics* 11: 47-67.

Aghion, Philippe, Alberto Alesina Francesco Trebbi. 2004, Endogenous Political Institutions. *Quarterly Journal of Economics* 119: 565-612.

Alschuler, Albert W. 1983. Implementing the Criminal Defendant's Right to Trial: Alternatives to the Plea Bargaining System. *University of Chicago Law Review* 50: 931-1050.

Alvazzi del Frate, Anna. 1998. *Victims of Crime in the Developing World*. Rome : United Nations Interregional Crime and Justice Research Institute. Available at http://www.unicri.it/wwd/analysis/icvs/pdf_files/No57/n57.htm

Baker, Scott and Claudio Mezzetti. 2001. Prosecutorial Resources, Plea Bargaining, and the Decision to Go to Trial. *Journal of Law Economics & Organization* 17: 149-167.

Bar-Gill, Oren and Omri Ben-Shahar. 2009. The Prisoners' (Plea Bargain) Dilemma. *Journal of Legal Analysis* 1: 737-773.

Bar-Gill, Oren and Oren Gazal Ayal. 2006. Plea Bargains Only for the Guilty. *Journal of Law and Economics* 49: 353-364.

Bárd, Károly. 2007. The Development of the Hungarian Criminal Law over the Past Twenty Years. *The Transformation of the Hungarian Legal Order 1985-2005*. Eds.Andras Jakab, Peter Takacs and Allan Tatham. Alphen aan den Rijn: Kluwer Law International.

Bautista, Antonio R. 2003. *Basic Criminal Procedure*. Manila: Rex Book Store.

Bradley, Craig M., ed. 2007. *Criminal Procedure: A World Wide Study*. 2nd. ed. Durham, N.C.: Carolina Academic Press.

Bureau of Justice Statistics. 1993, 2002. *The World Factbook of Criminal Justice Systems*. http://bjs.ojp.usdoj.gov/content/pub/html/wfcj.cfm.

Church, Thomas W. Jr. 1979. In Defense of "Bargain Justice". *Law and Society Review* 13: 509-525.

Dean, Meryll. 2002. *Japanese Legal System*. 2nd ed. London: Cavendish Pub.

Easterbrook, Frank H. 1983. Criminal Procedure as a Market System. *Journal of Legal Studies* 12: 289- 332.

European Commission. 2004. *Euro Justice.* http://www.euro-justice.com.

Federal Justice Statistics Resource Center, http://fjsrc.urban.org.

French Ministry of Justice. 2006. *Les chiffres-cles de la Justice.*

Grossman, Gene M. and Michael L. Katz. 1983. Plea Bargaining and Social Welfare. *American Economic Review* 73: 749-757.

Hatalak, Oskanna, Anna Alvazzi del Frate and Ugljesa Zvekic. 1998. The International Crime Survey in Countries in Transition. UNICRI Publication no 62, Rome.

Kaplow, Louis and Steven Shavell. 2002. Economic Analysis of Law. *Handbook of Public Economics*, Volume 3 (Alan J. Auerbach and Martin Feldstein editors, Elsevier, New York) 1661-1784.

Kritzer, Herbert M., ed. 2002. *Legal Systems of the World.* Santa Barbara, Calif.: ABC-CLIO.

Kyprianou, Despina. 2009. *The Role of the Cyprus Attorney General's Office in Prosecutions.* Heidelberg, New York: Springer Verlag.

La Porta, Rafael, Florencio Lopez-de-Silanes, and Andrei Shleifer. 2008. The Economic Consequences of Legal Origins. *Journal of Economic Literature* 46: 285–332. Data available at http://www.economics.harvard.edu/faculty/shleifer/files/JEL_%20web.xls.

Langbein, John H. 1978. Torture and Plea Bargaining, *University of Chicago Law Review* 46: 3-22.

Landes, William M. 1971. An Economics Anlaysis of the Courts. *Journal of Law and Economics* 14: 61-107.

Lo, Chang-fa. 2006. *The Legal Culture and System of Taiwan.* Alphen aan den Rijn: Kluwer Law International.

Merryman, John H. 1985. *The Civil Law Tradition.* 2nd. ed. Stanford, Calif.: Stanford University Press.

Miceli, Thomas J. 1996. Plea Bargaining and Deterrence: An Institutional Approach. *European Journal of Law and Economics* 3: 249-264.

Mongraina, Steeve and Joanne Roberts. 2009. Plea Bargaining with Budgetary Constraints. *International Review of Law and Economics* 29: 8-12.

Png, Ivan P.L. 1986. Optimal Subsidies and Damages in the Presence of Judicial Error. *International Review of Law and Economics* 6:101-105.

Polinsky, A. Mitchel and Steven Shavell. 1999. On the Disutility and Discounting of Imprisonment and the Theory of Deterrence. *Journal of Legal Studies* 28: 1-16.

Reinganum, Jennifer F. 1988. Plea Bargaining and Prosecutorial Discretion. *American Economic Review* 78: 713-728.

Reinganum, Jennifer F. 2000. Sentencing Guidelines, Judicial Discretion, and Plea Bargaining. *RAND Journal of Economics* 31: 62-81.

Schulhofer, Stephen J. 1992. Plea Bargaining as Disaster. *Yale Law Journal* 101: 1979-2009.

Scott, Robert E. and William J. Stuntz. 1992. Plea Bargaining as Contract. *Yale Law Journal* 101: 1909-1968.

Skeen, Andrew. 2004. Law of Criminal Procedure. *Introduction to the Law of South Africa.* Ed. C.G. van der Merwe and Jacques E. du Plessis. The Hague: Kluwer Law International.

Trechse, S. and M. Killias. 2004. Law of Criminal Procedure. *Introduction to Swiss Law.* Ed. F. Dessemontet and T. Ansay . 3rd. ed. The Hague: Kluwer Law International.

van Dijk, Jan, John van Kesteren and Paul Smit. 2007. Criminal Victimization in International Perspective: Key Findings from the 2004-2005 ICVS and EU ICS. The Hague: WODC. http://www.unicri.it/wwd/analysis/icvs/pdf_files/ICVS2004_05report.pdf